

Find the slope of a line that passes through the points $(\overset{x_1}{3}, \overset{y_1}{-5}) + (\overset{x_2}{-4}, \overset{y_2}{8})$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - (-5)}{-4 - 3} = \frac{13}{-7}$$

Write the equation of a line given a slope of -1 and "y"-intercept of 0 .

$$y = mx + b$$

$$y = -1x + 0$$

1.3 Linear Equations in Two Variables

$$y - y_1 = m(x - x_1)$$

Example 1: Write the equation of a line given two points.

- a. Write an equation in slope-intercept form for the line containing the points $(4, -3)$ and $(2, 1)$.

$$\textcircled{1} \quad m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - (-3)}{2 - 4} = \frac{4}{-2} = -2$$

$$\textcircled{2} \quad y - \underline{1} = \underline{-2}(x - \underline{2})$$

$$y - 1 = -2x + 4$$

$$y = -2x + 5$$

b. Write an equation in slope-intercept form for the line containing the points (6, 9) and (5, -6).

① Slope $\frac{-6-9}{5-6} = \frac{-15}{-1} = 15$

② plug $y - y_1 = m(x - x_1)$
 $y - 9 = 15(x - 6)$
 $y = 15x - 81$

Point-Slope Form: If a line has a slope of m and contains the point (x, y) , then the point-slope form is ...

$$\underline{y - y_1 = m(x - x_1)}$$

Example 2: Write the equation of a line given one point and the slope.

- a. Write an equation in slope-intercept form for the line that has a slope of $\frac{1}{2}$ and contains the point $(-8, 3)$.

$$y - \underline{3} = \underline{\frac{1}{2}} (x + \underline{8})$$

$$y - 3 = \frac{1}{2}x + 4$$

$$y = \frac{1}{2}x + 7$$

- b. Write an equation in slope-intercept form for the line that has a slope of $\frac{3}{4}$ and contains the point $(-12, 2)$.

$$y - 2 = \frac{3}{4}(x - -12)$$

$$y - 2 = \frac{3}{4}x + 9$$

$$y = \frac{3}{4}x + 11$$

Example 3: Marva left the house and drove at a constant speed to a conference in another state. She picked up Delia on the way. Two hours after picking up Delia, they were 140 miles from Marva's house, and 5 hours after picking up Delia, they were 344 miles from Delia's house. How far from her house was Marva when she picked up Delia?

